

In the Claims:

1 (previously amended) A multiple beam RF device  
comprising:

5 a housing having a central Z axis, said housing  
enclosing a plurality of electron beam tunnels, each said  
beam tunnel having a conductive inner surface, and each said  
beam tunnel further comprising a sequence of drift tubes and  
drift tube gaps, said beam tunnels arranged about said  
10 central Z axis of said housing, and said housing including a  
plurality of apertures, one said aperture for each said  
electron beam tunnel;

a plurality of electron guns equal to said plurality of  
said electron beam tunnels, each said electron gun producing  
15 an electron beam passing uniquely through one of said  
electron beam tunnels;

a magnetic field applied to each said electron beam,  
said magnetic field having a variation of less than 5% over  
the extent of said electron beam tunnels;

20 each said electron gun having a cathode for the  
generation of electrons, an anode for the acceleration of  
said electrons, and a focus electrode for the focusing of  
said electron beams;

a magnetic field corrector adjacent to each said  
25 electron gun cathode for correcting said magnetic field such  
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that said cathode surface has a magnetic field which is  
everywhere perpendicular to said cathode surface.

2(original) The RF device of claim 1 wherein said beam  
5 tunnels are arranged substantially parallel to said central  
Z axis.

3(previously amended) The RF device of claim 2 wherein  
at least one of said drift tube gaps includes a port for the  
10 introduction of RF energy, and at least one of said drift  
tube gaps includes a port for the removal of RF energy.

4(original) The RF device of claim 3 wherein said  
housing is made from iron.

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5(original) The RF device of claim 1 wherein said  
magnetic field is sufficient to achieve confined electron  
flow.

20 6(previously amended) The RF device of claim 1 wherein  
said magnetic field produces a confining force which exceeds  
the space charge forces in each said electron beam.

7(original) The RF device of claim 6 where the  
25 magnitude of said magnetic field is at least 2 times greater

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than said magnetic field required to balance said space charge force.

8(currently amended) A multiple beam RF device  
5 comprising:

a housing having a central Z axis and an R plane orthogonal to said Z axis, said housing enclosing a plurality of electron beam tunnels, each said beam tunnel having a conductive inner surface, and each said beam tunnel  
10 further comprising a sequence of drift tubes and drift tube gaps, said beam tunnels arranged in said housing and parallel to said central axis Z of said housing, said drift tubes having a minimum separation distance from said central axis Z of value D;

15 a plurality of electron guns, each said electron gun having a cathode ~~having~~ with a thermionic emitting surface for the generation of electrons, an anode for the acceleration of said electrons, and a focus electrode for the focusing of said electrons into an electron beam, said  
20 ~~cathode having a thermionic emitting surface for producing an~~ each said electron beam passing through one of said electron beam tunnels;

a magnetic field applied to each said electron beam,  
said magnetic field having a field variation of less than 5%  
over the extent of said electron beam tunnels;

~~each said electron gun having a cathode for the~~  
5 ~~generation of electrons, an anode for the acceleration of~~  
~~said electrons, and a focus electrode for the focusing of~~  
~~said electron beams;~~

~~at least one or more magnetic field correctors located~~  
~~near said cathode, said field corrector~~ modifying said  
10 magnetic field such that said magnetic field is  
perpendicular to each said cathode emitting surface.

9 (currently amended) The RF device of claim 8 wherein  
said one or more magnetic field corrector comprises a single  
15 coil located near at least one said electron gun cathode,  
and said extent of said single coil is less than said  
separation distance D.

10 (currently amended) The RF device of claim 8 wherein  
20 said one or more field corrector comprises a single coil  
located near at least one said electron gun cathode and said  
extent of said coil is greater than said separation distance  
D.

11.(currently amended) The RF device of claim 8 wherein  
said one or more field corrector comprises a first coil with  
an extent less than said separation distance D, and a second  
coil with an extent greater than said separation distance D,  
5 said first coil and said second coil located near at least  
one said electron gun cathode.

12(currently amended) The RF device of claim 8 wherein  
said one or more field corrector comprises a coil of  
10 current-carrying wire which produces said correction field.

13(currently amended) The RF device of claim 8 wherein  
said one or more field corrector comprises a permanent  
magnet.

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14(currently amended) The RF device of claim 8 wherein  
said one or more field corrector comprises non-magnetized  
iron.

20 15(currently amended) The RF device of claim ~~9,10,11,~~  
~~or 12~~ 9 or 10 wherein said coil comprises a coil of  
current-carrying wire which produces said correction field.

16-17 (cancelled)

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18-20(cancelled)

5           21(currently amended) The RF device of claim 8, wherein  
said one or more field corrector is located on the ~~main~~  
central axis of said device, said field corrector has a near  
end in proximity to said housing and intersecting said  
central Z axis, and a far end opposite said near end, said  
10 field corrector comprising a radially symmetric magnetic  
cylinder, said field corrector having a first radius ~~which~~  
~~is smaller~~ on said near end, and a second radius on said far  
end which is larger than said first radius. ~~larger at any~~  
~~point near said far end.~~

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22(currently amended) The RF device of claim 21, said  
one or more field corrector further including an  
electromagnetic coil on said smaller radius.

20           23(currently amended) The RF device of claim 21 or 22,  
said one or more field corrector further including field  
correcting cutouts around said plurality of electron guns.

24(currently amended) The RF device of claim 8 wherein  
25 said one or more field corrector provides a magnetic field

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such that equipotential flux lines formed by said magnetic field when modified by said field corrector are substantially parallel to said electron beam tunnels.

5        25(original) The RF device of claim 1 or 8 wherein said RF device is an oscillator.

26(original) The RF device of claim 1 or 8 wherein said RF device is an amplifier.

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27 (currently amended) A magnetic circuit for influencing the trajectories of a plurality of electron beams, said magnetic circuit comprising:

15        a cylindrical enclosure having a central axis and a first end cap having a plurality of apertures for the introduction of a plurality of electron beams and a second end cap for the removal of said electron beams, each said beam starting from a thermionic cathode;

20        a main field generator producing a magnetic field perpendicular to said central axis;

25        a circularly symmetric flange located on said central axis, said flange having a small diameter part for the disposition of a magnetic field generator and a large diameter part for introducing said field proximal to at least one of said cathodes;

~~optionally~~, additional magnetic field correctors.

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28 (previously added) The magnetic circuit of claim 27  
where said magnetic field generator is a coil wound about  
said small diameter.

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29 (previously added) The magnetic circuit of claim 27  
where said magnetic field generator is a circular permanent  
magnet.

10 30 (previously added) The magnetic circuit of claim 27  
where said additional magnetic field correctors includes a  
supplemental circular field generator located on the outer  
surface of said first end cap, having a center on said  
central axis, and having a diameter sufficient to enclose  
15 said apertures on said first end cap inside said diameter of  
said supplemental field generator.

31 (previously added) The magnetic field generator of  
claim 30 where said supplemental field generator is an  
20 electromagnetic coil.

32 (previously added) The magnetic field generator of  
claim 30 where said supplemental field generator is a  
permanent magnet.

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33 (currently amended) The magnetic field generator of  
~~claim 30~~ claim 27 where said main field generator is an  
electromagnetic coil.

5        34 (currently amended) The magnetic field generator of  
~~claim 30~~ claim 27 where said main field generator is a  
permanent magnet.

35 (claim 15 re-presented as a new claim) The RF device  
10 of claim 11 wherein said first coil comprises a coil of  
current-carrying wire which produces said correction field.

36 (claim 15 re-presented as a new claim) The RF device  
of claim 11 wherein said second coil comprises a coil of  
15 current-carrying wire which produces said correction field.

37 (claim 27 re-presented as a new claim) A magnetic  
circuit for influencing the trajectories of a plurality of  
electron beams, said magnetic circuit comprising:

20        a cylindrical enclosure having a central axis and a  
first end cap having a plurality of apertures for the  
introduction of a plurality of electron beams and a second  
end cap for the removal of said electron beams, each said  
beam starting from a thermionic cathode;

25        a main field generator producing a magnetic field  
perpendicular to said central axis;

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a circularly symmetric flange located on said central axis, said flange having a small diameter part for the disposition of a magnetic field generator and a large diameter part for introducing said field proximal to at least one of said cathodes.

~~optionally, additional magnetic field correctors.~~

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